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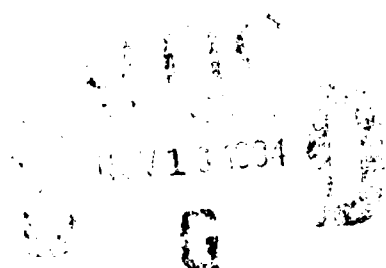


W. W. HANSEN EXPERIMENTAL PHYSICS LABORATORY

STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-4085

17 October 1994

Linden Clausen
Office of Naval Research
Resident Representative
Stanford University
McCullough Building, room 202
Stanford, CA 94305-4055



Subject: Final Report

Reference: Contract N00014-86-K-0118, Infra-Red Free Electron Laser Facility

Dear Mr. Clausen;

One Copy of the Final Report for the referenced Contract is submitted for your records as required by Block 25, DD Form 2222. Under separate cover two copies are being sent to the Defense Technical Information Center and one copy will be sent to the Scientific Program Officer, Dr. Michael Marron. Should you have any questions concerning this submittal please contact me at (415) 723-0102.

Sincerely;

Robert A. Farnsworth
Associate Director

Valerie M. G. Mallace
Senior Contract Officer



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To: Robert Farnsworth

October 14, 1994

From: Todd Smith

Subject: Final Report for Free Electron Laser Program Contract N00014-86-K-0118

Funds provided under ONR Contract N00014-K-0118 are intended to help turn the Superconducting Linear Accelerator (SLA) based free electron laser (FEL) program at Stanford into a reliable and productive facility, enabling FEL produced photons to be used in a variety of areas of scientific research. The present Stanford Picosecond Free Electron Laser Center began taking shape under the contract, which was in effect from Feb. 1986 through Sept. 1991. Substantial modifications to the refrigeration plant and cryogenic systems associated with the SLA were made to improve operational reliability; four experimental rooms dedicated to using the FEL beam were constructed; a 100 meter beam transport system was installed to deliver the beam from the FEL to the new rooms; collaborations were established with first rate researchers in materials science and chemistry who wanted to exploit the properties of the FEL beams; a shielding wall and new beam dump were installed at the end of the SLA to allow the system to operate without being influenced by, or influencing, other activities in the laboratory; the operating wavelength range of the FEL was increased to cover from 1.5 μm to 4.5 μm ; computer control of the linac was initiated; and staff was added-both senior and technical level.

As a result of these actions, the facility provided over 300 hours, as planned, for researchers in each of the last three scheduled operational runs (June 1989, December 1989, and August 1990) during the contract period. (It is true that the December 1989 run had been scheduled for November. It was delayed by the Loma Prieta earthquake!)

Additional evidence of the success of the program is presented in the form of the attached list of publications which resulted from the facilities activities. There are 14 papers dealing with FEL science and facility issues, and an additional 14 papers on materials science and chemistry.

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